by anodic oxidation using aluminum, homogeneous and regular pore formation is possible by regularly forming desired asperities to be a starting point of the pore formation on the aluminum surface in advance. That is, as a concave portion on the aluminum surface is more easily oxidized, the aluminum dissolves as the oxidation progresses so that the pores are successively formed.

As a method of forming such regular asperities on the aluminum surface, a method whereby a focusing ion beam is used, a method whereby a stamp with the asperities is pressed on the aluminum surface, a method whereby a convex portion is regularly formed with a resist or something similar and so on can be named. In addition, the pore formation regularized over large area is possible by performing two-phase anodic oxidation. To be more specific, it is a method whereby a porous coating formed by the anodic oxidation is removed once and then the anodic oxidation is performed again so as to make the porous coating with the pores showing better verticality, linearity and independence. This method is using the fact that a concave on the surface of the Al plate created when removing the anodic oxidation coating formed by the first anodic oxidation becomes the starting point for the pore formation of the second anodic oxidation.

To be more specific, if an oxidation zone is

etched after performing the anodic oxidation once and the anodic oxidation is performed again, the remainder of the first oxidation zone forms the asperities on the aluminum surface so that the pores are regularly formed.

Thus, an extremely thin oxidation zone is left on a pore bottom 11 that is regularly formed. This zone is removed to have the pore extend through the substrate and form the channel 2 as shown in FIG. 4C. As for a method of removing the pore bottom 11, chemical etching, a method of physically shaving it and so on can be named. The pore diameter can be extended thereafter by performing a pore-widening process as required.

The inside of the pore 6 thus formed by the aluminum anodic oxidation forms an uneven surface with irregular and minute asperities. It is possible thereafter to have even more minute asperities formed inside the pore by coating the inside of the pore with grains. Thus, formation of the minute asperities inside the pore that is the electron multiplier surface 3 of the channel 2 increases the number of times of collision and scattering of the electrons incident inside the channel, and a form can be acquired, wherein the surface area of the electron multiplier surface becomes larger than the even surface so that the secondary electron emission efficiency can be improved.

As for a method of coating the grains on the electron multiplier surface, a method whereby they are soaked in solgel liquid, the CVD method and so on can be named.

In addition, it is desirable that, by selecting a material of which secondary electron emission factor is high as the grain material to be coated, the number of the secondary electrons generated by the electrons colliding with the electron multiplier surface increases. As for such materials of which secondary electron emission efficiency is high with its secondary electron emission coefficient larger than 1 for instance, the oxides such as BeO, MgO and BaO, diamond, graphite, carbon such as glassy carbon or a mixture of them and so on can be named.

Thereafter, as shown in FIG. 4D, the cathode electrode 4 and the anode electrode 5 can be formed on both faces of the insulating substrate 1 having the channel 2 thus formed so as to render it as a multi-channel plate.

The cathode electrode 4 and the anode electrode 5 are intended to apply a potential to the electron multiplier surface 3, and are formed by sputtering or vacuum evaporation of metals such as Au/Ti and Al to be approximately 0.1 to 0.5 μm thick. On this occasion, evaporation by a parallel beam of metallic atoms is performed so that the metal for the electrodes will not